THE UNIVERSITY OF CHICAGO

ROUND TABLE

WORLD PROGRESS IN CANCER RESEARCH

A Radio Discussion by J. ENGELBRETH-HOLM
W. U. GARDNER, ALEXANDER HADDOW
CHARLES HUGGINS *and* LEONARD SCHEELE

Including a Special Supplement on
HOW THE UNITED STATES FIGHTS CANCER

4TH BROADCAST IN COOPERATION WITH
HE NATIONAL BROADCASTING COMPANY

UMBER 493 * * * AUGUST 31, 1947

Illinois U Librar

Around the Round Table . . . .

DR. WILLIAM U. GARDNER, professor of anatomy and chairman of the department o anatomy at the Yale University School of Medicine, was born in Minnesota. He received his B.S degree at South Dakota State College and his A.M. and Ph.D. degrees at the University o Missouri. From 1933 to 1935 he was a fellow of the National Research Council; from 1935 t 1943 he was instructor and assistant professor of anatomy at the Yale University School o Medicine. He has held his present position there since 1943. Dr. Gardner has written chapte in several books on endocrinology and physiology. He is president of the American Associatio for Cancer Research.

DR. JULIUS ENGELBRETH-HOLM is professor of pathology and director of the Universit Institute of Pathological Anatomy of Copenhagen. Dr. Holm was born in Copenhagen and r ceived his M.D. degree at the University of Copenhagen. He is a member of the Scandinavia Pathological Association, the Pathology Society of Great Britain and Ireland, the Danis Medical Association, and the Swedish Medical Association. Dr. Holm is the author of *Spontan ous and Experimental Leukemia in Animals* (1942).

DR. CHARLES B. HUGGINS, professor of surgery at the University of Chicago, was born i Halifax, Canada. After receiving his B.A. degree from Acadian University in 1920, he entere the medical school at Harvard University, where he received an M.D. degree in 1924. D Huggins interned in surgery at the University of Michigan for two years and remained there a instructor in surgery until 1927, when he joined the staff of the University of Chicago. He ha been associated with the University in varying capacities since that time, having become pr fessor of surgery in 1936. In 1943 the National Academy of Science granted him the Charles L Meyer award for his research on cancer.

DR. ALEXANDER HADDOW, professor of experimental pathology at the University of Lo don, was born in Leven, Scotland. He received his M.B., Ch.B., M.D., Ph.D., and D.Sc. degree at the University of Edinburgh. Dr. Haddow was lecturer in bacteriology at the University o Edinburgh from 1931 to 1936. He has been a member of the research staff of the Royal Canc Hospital in London since 1937. He is also director of the Chester Beatty Research Institute of th Royal Cancer Hospital in London. He is a member of the Grand Council, British Empire Canc Campaign, and is vice-chairman of the Scientific Committee on Oestrogens in Cancer.

DR. LEONARD SCHEELE, director of the National Cancer Institute and Assistant Surgeo General of the United States Public Health Service, has been a medical officer for the Publ Health Service since 1934. As a member of the Supreme Headquarters Staff he served with th United States Army to assist in the handling of civilian problems in Italy and northwester Europe. Dr. Scheele was born in Fort Wayne, Indiana, and received his A.B. degree from the Un versity of Michigan and his M.D. degree from Wayne University. He was extensively cite during and after World War II for outstanding accomplishments in typhus control and th control of communicable disease in northwestern Europe.

The opinion of each ROUND TABLE *speaker is his own and in no way involves the responsibility of either th University of Chicago or the National Broadcasting Company. The supplementary information in this pamphl has been developed by staff research and is not to be considered as representing the opinions of the* ROUND TABL *speakers.*

The University of Chicago ROUND TABLE. *Published weekly. 10 cents a copy; full-year subscription, 52 i sues, three dollars. Published by the University of Chicago, Chicago 37, Illinois. Entered as second-class matt January 3, 1939, at the post office at Chicago, Illinois, under the Act of March 3, 1879.*

COPYRIGHT, THE UNIVERSITY OF CHICAGO, 1947

Illinois U Library

World Progress in Cancer Research

*

Dr. Huggins: This week a meeting of cancer research workers m nearly forty countries will take place in St. Louis. Four of these erts are here with me to discuss the problems of cancer research. The problem of cancer evidently is one of considerable complexity l of great magnitude. The argument can easily be defended that ncer is as great a scourge to the human race as war. Cancer is a ease of universal distribution which affects all the higher forms of —man, the animals, and even plants. When some of the cell units which the body is composed undergo change so that they multiply an abnormally rapid rate and acquire new properties of penetrating surrounding tissues or spreading to distant organs, then cancer is sent. The scientific problem, accordingly, is a problem of the wth and proliferation in a malignant form of the cells of which the ly is normally composed. Unless the disease is checked, one is over-elmed—the effect being that man is literally consumed by his own h.

Most people have, in the imagination, the slow and painful destruc- n perhaps of some relative or friend by malignant disease. As we w older, this becomes more vivid and distasteful, because as Sir omas Browne wrote in the seventeenth century, "The long habit of ng makes meer Men more hardly to part with Life and, all to be hing but what is to come."

The pronouncement of the presence of a malignant tumor does n arouse in the physician the consternation with which that diagnos is always received by the patient and his family. The doctor kno that thousands upon thousands of patients are cured each year by t wonderful methods of treatment now available—by surgical oper tion, radium, and X-ray, as well as by the new medicines which ha recently been found to be of value in the treatment of several kinds cancer. The serious problem of cancer is concerned with far-advance malignant growths in which treatment has been delayed throug procrastination on the part of the patient or because the cancer h developed in such a subtle and insidious manner as not to manife itself until the tumor is in a late stage where it may be uncontrollabl

Activities in the cancer field may be placed in three general cat gories, namely, education, service, and laboratory investigation. Edu cation is concerned with teaching the public some of the commo symptoms of cancer so that people will seek diagnosis and treatmer while the disease is still early and easily cured.

The service division belongs exclusively to the physician, who alon has special knowledge of the recognition and correction of cancer. It very sad that quacks and charlatans, to an alarming extent and quit illegally, proceed with their criminal mismanagement of the gullibl through the use of pastes, ointments, and other fake methods, thu withdrawing from many any chance for cure.

The study of cancer in the laboratory attempts to understand th disease and to devise methods for its control. Medicine is makin rapid advances in both these fields. It may be stated categorically tha in the main cancer problem—that is, the state of advanced cancer— the only significant activity is research. It is too late to start researc when some friend develops the disease. Obviously, cancer researc must be supported adequately, and now!

There are some questions which may be discussed profitably abou cancer research. How are European and American experts working i

e cancer field? Does the outlook in cancer research appear promis-
g? Dr. Gardner, what, in your opinion, are the most fruitful avenues
approach to cancer research?

DR. GARDNER: It is difficult to predict what lines of research may
of the greatest value in the solution of the problems of cancer.
any of the techniques used today in the study of cancer were devel-
ed by scientists not at that time working on cancer. For example,
ht here in St. Louis, twenty-five years ago, two young investigators,
anatomist, Dr. Edgar Allen, and a biochemist, Dr. E. A. Doisy,
owed that the ovaries produce a hormone which causes growth of
e reproductive organs in male or in female mice and rats, and, in-
lentally, also in other mammals. They devised a method by which
ese hormones could be detected in animals. These two scientists
re not investigating cancer but were investigating reproduction.
t, their discoveries introduced many subsequent investigations on
e influence of ovarian hormones on cancer, not only in experimental
imals but also in man.

Furthermore, Dr. Huggins, I think that your great contribution to
e treatment of cancer of the prostate in man was based largely upon
ur previous experiences with laboratory animals. In fact, I think
t this is a remarkable example of the contribution of fundamental
logical research to the treatment of cancer, and I should like to cite

Over ten years ago, Dr. Huggins was working with the growth of
nes and the formation of stones in the kidneys and bladder. A cer-
n substance is present in growing bones which is responsible for the
alization of minerals. This substance is an enzyme, and this par-
ular enzyme is called "phosphatase." Phosphatase acts on the
osphorus-containing compounds in bones. Now it happens that
re are several kinds of phosphatase and that one phosphatase is
sent in large amounts in the prostate glands. Dr. Huggins noted
t the prostates of young dogs and mature dogs, from which the

male reproductive organs had been removed, contained little pho phatase. Furthermore, he observed that when adult dogs were giv ovarian hormones—the same ones which Dr. Allen and Dr. Doi had discovered more than fifteen years earlier—the phosphatase d creased in amount.

These studies on phosphatase might seem to have no relation cancer, but these studies formed the basis for the present method treatment of cancer in man. Dr. Huggins found that large amounts phosphatase were present in the prostatic tissue in the blood of p tients with prostatic cancer. He must have asked himself, "Can pho phatase in the cancerous prostatic tissue be reduced in the same ma ner as that of normal prostatic tissue?" He found that it was so r duced. Not only did the phosphatase decrease in the cancerous p tients, but they felt better. They returned to their usual activitie and, in many instances, the tumors became smaller or even di appeared. Unfortunately this is not true of all patients with prostat cancer, so the problem is not entirely solved.

Investigations undertaken in our own laboratories have reveale that the ovarian hormones, the same ones used in the treatment prostatic cancer in man, cause cancer in experimental animals und some conditions. For example, mammary cancer, cancer of the uterir cervix and lymphoid tissues, and tumors of the reproductive orga and pituitary glands develop in mice which have received ovaria hormones in large amounts and for long periods of time. Mice of or inbred strain, for example, may acquire, under such conditions, t mors of one type; and mice of other strains acquire tumors of oth types. Hereditary factors definitely influence the tendencies of mi and of animals of some strains and other species, given ovarian ho mones, to have cancer of the organs which I have just mentioned.

It is possible that the same hormones may influence the formatio of cancer in human beings—it is possible—or in some human bein who have latent tendencies for these tumors.

Now, I have cited some examples of how researches in but one field biology have contributed to our understanding of the treatment of few kinds of cancer. Many investigators of other aspects of biology ve also contributed much. We have much more to learn.

DR. HUGGINS: Thank you, Dr. Gardner.

To continue the discussion, we have the good fortune to have with Dr. Julius Engelbreth-Holm, who is an official delegate from Denark to the International Cancer Congress. He is also the director of e outstanding cancer laboratory in his country. Dr. Engelbrethlm, how extensively is cancer research being carried out in Scannavia?

DR. ENGELBRETH-HOLM: As to the work going on in Scandinavia, should like to mention some of the most important research proams. Biochemistry and biophysics play a steadily increasing role, d in these fields the most outstanding work is done by Caspersson d his school in Stockholm. By means of a very ingenius setup, they e analyzing the metabolism of nuclear substances in human and imal cells, in bacteria, and in viruses. It has already been shown at the protein metabolism in cancer cells is abnormal in different ys. I do think that we can expect further important news from this ockholm group.

In Danish cancer research a new feature is our cancer registration. ery single case of malignant disease is on file; and the particular se can be followed up with regular inspection, if desired. We have eady had very interesting news from this registration office as to the e of heredity in certain tumors and as to the connection between ferent malignant tumors. Here, as in animal experiment, it has come obvious that we must investigate the different tumors indendently. Different tumors behave differently and ought, perhaps, to considered different, though related, diseases, just as we consider

typhoid fever and pneumonia different diseases in spite of their com mon nature as infectious diseases.

Another line of investigation which I consider rather interesting the work done in my own institute at Copenhagen on acceleration an speeding up the development of spontaneous tumors in mice. It ha been found that, by treatment with carcinogenic substances, it is onl possible to develop tumors which occur spontaneously in these an mals. This has led to the hypothesis that development of malignan tumors is possible only in certain tissues in a given organism, or, i other words, that tumors possibly cannot occur in all different tissue in all species but only in those tissues which, as a result of heredity are prone to tumor development. At the present we are trying to sho whether this hypothesis is right or wrong.

Several other problems are under investigation in Scandinavia an the rest of Europe. The time will not allow me to go through all c them. Many of them are naturally similar to, or identical with, som of the questions being investigated in this country.

However, it is interesting to note that the work done here in th United States and in Europe is not altogether identical. In Europe w cannot take up certain problems now being investigated by the bi American teams—for instance, the testing, one by one, of hundreds o even thousands of compounds in chemotherapy. We cannot afford t do this or to do the extensive work with radioactive isotopes, becaus we do not have these substances in sufficient amounts in Europe. I Europe cancer research work is done mostly by individual workers o by small teams.

In my opinion, this is all right. Big teams and small teams and indi vidual scientists supplement each other in a very useful way. Differen problems can be attacked by these different ways of working. It mus be admitted, however, that the lone wolf can deal only with detailed problems, as the problems of cancer now are so complicated—involv ing biochemistry, biophysics, biology, pathology, heredity, radiology

nd much more—that a single brain cannot cover all the fields. We are rced to join up in teams.

Personally I prefer smaller teams of six or eight workers. I am a ttle afraid that in the very big teams it may be difficult to keep in ose contact with all the colleagues. Cancer research cannot be compared with the construction of an atomic bomb. It is too early; we now too little.

In Europe most of the work is supported by private means, except rhaps in Sweden, where the Socialist government now has realized e necessity of supporting the scientific work done in the university stitutes to a much greater extent than, for instance, in Denmark, here more than 90 per cent of the expenses are paid by private funds. oo much time is spent in efforts to dig up money. I know that from d personal experience. However, it could be worse, and I should like express our gratitude to the foundations in this country and in England which are helping us.

As I said before, I think that big teams, small teams, and individual orkers supplement one another in work done. It would, however, be ry important if the different centers of cancer research work were ore intimately connected. If this Cancer Congress could succeed in tablishing some means of international collaboration, it would certainly be one of the most important conferences ever held. It would be tremendous help to all cancer research workers the whole world er. Cancer research is, without doubt, the most important thing our fight against these horrible diseases.

We are all working with the ultimate purpose of finding new ways treatment. Our treatments of today are mainly trying to cure the tients by killing the cancer cells through X-rays and radium or by moving the cells through surgery. The rational treatment would be transform them to normal cells. This is only possible by intensified search work.

DR. HUGGINS: British science has flourished since Newton ar Boyle. Our next speaker, Dr. Alexander Haddow, is director of th largest institute for cancer research in Great Britain. He is certain continuing in the great tradition of English medicine. Dr. Haddo will you tell us what the British cancer workers are up to?

DR. HADDOW: Contributions have been made to the developmer of cancer research in nearly every country in the world, but Britai has, I think, played an outstanding part from the very beginnin In the earliest days many of the classics on the subject were due to th great English surgeons and pathologists of the eighteenth and nin teenth centuries. Secondly, over forty years ago there was founded body known as the Imperial Cancer Research Fund, the work of whic laid the basis of the natural history of cancer.

After the first war, attention was attracted to the way in whic normal cells can be changed into cancer cells artificially. It has bee known for a very long time that certain kinds of cancer, which are me with in industry, are due to exposure of the skin to mineral oil or t tar. At the Royal Cancer Hospital in London, Sir Ernest Kennawa and his school then investigated this matter. They made tremendou advances in our knowledge of the chemistry of the substances causin this particular form of the disease. This work gave an impetus to can cer research not merely in Britain but all over the world.

In this short time I can give only one or two examples of mor recent discoveries. One was the synthesis a few years ago of th chemical substance known as stilboestrol—a piece of work carried ou jointly by Professor Dodds of the Middlesex Hospital in London an Sir Robert Robinson at Oxford. This artificial substance has the prop erty of imitating the action of the female sex hormone which, as Dr Gardner has already mentioned, influences the course of cancer of th prostate in man. So, it has come about that stilboestrol is of grea practical usefulness in treating this particular disease.

Another example is the action of the chemical substance known as rethane in the disease of leukemia. Leukemia is a condition due to he excessive growth of certain blood cells. Several years ago we tarted a program of research on substances likely to interfere with the rocess of division of body cells generally. Various French workers had lready reported that a substance related to urethane was able to pro- uce interesting effects of this kind on the division of plant cells. For his reason we paid special attention to a whole series of such com- ounds. To make a long story short, we found that urethane certainly nterfered with cell division and also produced slight inhibition of the rowth of various animal tumors. Since urethane had already been sed in medicine for many years as a mild anaesthetic, we decided to est its effect on advanced cancer. After two or three years' work the esults were mainly discouraging. By that time we were, however, co- perating with Dr. Edith Patterson, of the Christie Hospital in Man- hester. Very fortunately, she then noticed that urethane produced a light decrease in the number of the white cells of the blood. Follow- ng this fresh observation, the drug was then tested in cases of leuke- nia, which can be looked on as a cancer of these white blood cells. t once it was obvious that urethane has, in fact, a very marked in- uence, similar to that of X-rays, on the course of the disease. These esults were published in 1946. Although the drug is never curative, it an produce a limited benefit in a proportion of the cases. The main nterest of the observation is, however, as a stepping-stone for further nvestigation and progress.

These three discoveries—namely, the chemistry of substances which roduce cancer, the chemistry of substances which imitate the natural ction of the female hormone, and the effect of urethane on leukemia— re only examples of recent cancer research in Britain. There are many thers. What they illustrate is, first of all, the close dependence of ancer research on the growth of the basic sciences generally, and specially on chemistry. That is, they underline the conclusions which

Dr. Gardner has already drawn. Secondly, they show the benefit which may come from close cooperation between different disciplines in the solution of all these problems. Not only is the study of cancer benefited from the basic sciences, but the converse is also true. In this subject we therefore have the opportunity not only of contributing to the solution of a special problem in medicine but also of repaying our debt to the basic sciences as well by increasing knowledge of one of the outstanding problems in biology—the problem of the growth of cells.

Dr. Huggins: From all this it appears that the work of the cancer research workers in the last few years has been productive and scientifically exciting. When even one cancer can be affected beneficially by simple treatment such as medicines, we have the confidence that all cancers will eventually yield to these measures. The story of the research development of these new medical treatments of cancer resembles the development of the airplane. When the Wright brothers at Kittyhawk demonstrated by the flight for a few seconds of a machine heavier than air, the eventual development of aviation was assured. In cancer treatment we are in the Kittyhawk stage.

Our next speaker, Dr. Leonard Scheele, has the honor of being the director of the National Cancer Institute and is responsible for the administration of the federal government's cancer activities. Dr. Scheele, please tell us something of the activities of the United States Public Health Service in cancer research.

Dr. Scheele: The National Cancer Institute conducts original laboratory research of its own. More than two hundred and fifty scientists, technicians, and attendants work in several research sections. What are these sections and their work? In the biology section, cancer is studied in animals in an effort to throw light on the behavior of the disease in man. Endocrinology explores the role of hormones in the causation and treatment of cancer. Biophysics utilizes physical agents and methods such as radioactive isotopes, X-rays, electron micro-

opes, and the high-speed, ultra-centrifuges in the study of cancer. he purpose of biochemistry is to find what chemical substances are esent in cancer and whether they differ from chemicals found in ormal organs and to discover what chemical reactions cause cancer grow continuously. In chemotherapy there is a systematic search r chemical agents which might lead to the development of a chemical eatment of one or more types of cancer in human patients. Cancer athology is primarily concerned with the study, under the micro- ope, of changes that take place in cells.

The Cancer Institute's direct study of human cancer is not exten- ve. However, some work is carried on in certain hospitals which rve as clinical research laboratories. A new appropriation of two illion and six hundred thousand dollars this year will enable the ublic Health Service to begin to develop plans for the urgently eeded clinical research facilities in Bethesda, Maryland.

To aid research scientists in knowing what their fellow-scientists are oing, the Institute publishes the bimonthly *Journal of the National ancer Institute*.

By far the major part of the Institute's research expenditures goes to grants-in-aid for research in universities, hospitals, and other pes of institutions. Since 1938, when the first grants were made, xty-eight different research agencies or individuals working in wenty-five states have received grants totaling over one million and ght hundred thousand dollars. Appropriations this year will enable ne Institute to give more than three times this much to outside oups. Until last year, grants were made only for specific projects hich had to be outlined in some detail as to material, time, personnel, nd funds. A new policy gives research institutions greater leeway in etermining their own activities and allows the Institute to make a w institutional grants of a general nature. This gives scientists eater leeway in following research leads and also makes possible the oordination of many phases of cancer research in one institution.

One of the most serious deterrents to cancer research has been the lack of assured, long-range support for projects. This year, for the first time, through the foresight of Congress in providing funds for cancer research and education, a few grants can be given to research groups for at least two years ahead. Another innovation makes it possible to give funds for the acquisition of land and the construction of laboratories and clinical research facilities where urgently needed.

It is hoped, also, that increased assistance can be given to support research beds and clinical research. Authority and law to do these things exist, but we do not have enough money to enable us more than to scratch the surface in these types of activity. The entire appropriation by Congress for the National Cancer Institute this year is fourteen million dollars. This must cover cancer control activities and assistance in clinical cancer teaching, in addition to financing the research programs.

The war prevented many young men from becoming scientists. Large numbers of scientists who might otherwise have been available for cancer research have been drawn off to industrial and other non-medical research groups. More trained scientists are needed before cancer research can become the all-out effort the country demands. To meet this need we provide fellowships to enable scientists to do special work in a cancer hospital laboratory, or at the Institute itself, in preparation for full-time work in cancer research. One hundred fellowships will be available annually under the present expanded program.

We are all in St. Louis to attend this Fourth International Cancer Research Congress. We all realize that there is need for assistance in financing cancer research abroad. Last Wednesday, the Steelman Committee, in its report to President Truman, recommended that such assistance be given to bring European science and laboratories up to their prewar level. The National Cancer Institute hopes to give such assistance but can give only limited help this year.

A Special Supplement

on

HOW THE UNITED STATES FIGHTS CANCER

(Excerpts from a pamphlet on the cancer program of the National Cancer Institute published by the United States Public Health Service in Bethesda, Maryland)

*

U.S. FIGHTS CANCER

Because cancer has advanced in the last 25 years from seventh to cond* place as a cause of death in the United States, our Congress s authorized a broad and intensive campaign to fight it. Paradoxi-lly, the scientific discoveries, medical advances and public health easures that have made it possible for more Americans to live longer ve also made it probable that more Americans will die of cancer. It in the middle and late years of life that cancer takes its greatest toll. Babies born in the United States today have a life expectancy of years. With this gift of longevity goes a penalty: 20 percent of the ys and 22 percent of the girls, it is estimated, will have cancer some-ne in their lives. How many die of it depends upon whether some tter means of prevention, diagnosis or cure is found, or failing that, ether the cancer is detected early enough for successful treatment the three present-day accepted methods—surgery, x-ray or radium.

* Second only to heart disease.

Upon these two alternatives, the U.S. cancer program is based. It long-range aim is to find the cause and some more adequate method o prevention or cure; its immediate aim is to cut the death toll by stimu lating early diagnosis and treatment. This is the working pattern fo the National Cancer Institute of the U.S. Public Health Service, th agency that spearheads the fight against cancer by the United State Government.

The present U.S. cancer program was launched in 1937 by th National Cancer Institute Act. This placed the National Cancer Insti tute in the U.S. Public Health Service, and created the National Ad visory Cancer Council to advise it.

BUDGET AND ORGANIZATION

The original Cancer Act placed a $700,000 annual ceiling on cance appropriations. This was removed before the end of the war and Con gress increased research funds from $490,000 for 1946 (fiscal) t $1,772,000 for 1947. At the same time, and for the first time, specia appropriations were made to be spent by the States on "cancer con trol" programs chiefly concerned with educating the medical profes sion and the public to make better and earlier use of existing knowl edge about treatment and diagnosis. Until 1947 this work had beer handled almost entirely by a voluntary health organization, th American Society for the Control of Cancer (now the American Cance Society).

For 1948, cancer appropriations have been raised to $14,000,000 About a third of this will go into cancer control, the rest into research The Institute will be able to expand its laboratory research, its clinica research—the valuable study of actual cancer cases—and its trainin program for research scientists and clinicians, without whom neithe laboratory nor clinical study can go very far. The bulk of new funds however, will be spent on research outside the Institute, and to in augurate an expanded training program for scientists and clinicians

CANCER CONTROL

The government's cancer program most directly reaches the individual citizen through the cancer control activities of his own State community. Up to July, 1946, when Congress appropriated $2,500,000 for cancer grants to the States, the Public Health Service was able to assist these activities only through consultation and funds amounting to less than $250,000 a year.

Now most of the States are receiving greatly increased grants-in-aid for expansion of their cancer control programs. These grants, which differ from NCI's research grants, are concerned primarily with diagnosis and treatment. They are made by the Cancer Control Subdivision of the Institute to the official agency in each State that is responsible for the cancer control program. This is usually the State Health Department. In 1948 (fiscal), $5,500,000 will be spent on cancer control.

Although the States must submit plans and budgets in order to receive grants, they are free to develop their programs according to local needs. Usually a program is developed in cooperation with the State Medical Society and the State Cancer Society. Statistical research into types, numbers and location of cancer cases is often basic to the planning.

The main aim of the control program is to reduce the number of cancer deaths by helping the nation's estimated 175,000 practicing physicians and their patients make the most effective use of what we already know about cancer.

Aid to the medical profession is given in three ways: through grants of to $25,000 each to medical schools for improving both the quality and quantity of their cancer education, through traineeships to young physicians at $10 per day for graduate clinical study in cancer, and through the production of educational materials.

MEDICAL SCHOOLS AND TRAINEES

To seek ways of improving undergraduate cancer education, th National Advisory Cancer Council invited medical school deans, pr fessors and others interested in medical education to a conference the NCI in November, 1946. As a result of these proceedings, whic appear in the August, 1947 issue of the Institute *Journal*, the Adviso Council recommended: that medical schools review their cancer teac ing and consider adding additional concentrated courses, preferably the senior year, in which the pathology, physiology and biochemist of cancer are correlated with a weekly clinic devoted to cancer various sites; that they undertake to encourage cancer research medical schools as a stimulus to cancer teaching and student interes and that ways be found to financially assist this program.

Scarcely was the ink dry on the 1948 Appropriation Act than th Institute implemented these recommendations by granting financi aid to two medical schools that plan to coordinate cancer teaching- Washington University in St. Louis, Missouri, and Yale Universit More grants will be given as other schools make application.

The program to help medical schools improve cancer training fairly new, but for several years the Institute has been providin traineeships to help graduate physicians take work leading to sp cialization in cancer; at present there are 77 doctors in trainin Traineeships provide up to three years of full-time postgraduate wor in a hospital with facilities for well rounded cancer training, includin radiology, surgery and pathology. The trainee may select his ow hospital, but must be acceptable to that hospital.

To be eligible, an applicant must be under 40 years of age, a gradu ate of an approved medical school, and have completed a one-yea rotating or surgical internship in an approved hospital. More informa tion and application blanks may be obtained from the Director, Na tional Cancer Institute, Bethesda, Maryland.

AID TO PHYSICIANS

Even though cancer is on the increase, the practicing physician ually does not see more than four or five cases a year. Thus it is fficult for him to maintain familiarity with a disease that requires ompt recognition and treatment for its cure. Cooperating with edical societies, schools and hospitals in keeping physicians better formed on cancer is an essential function of a State cancer control ogram.

One method is through short-term refresher courses in which physi-ans, surgeons, radiologists, pathologists and others can obtain train-g in modern methods of treatment and diagnosis. Cancer control nds may be used for instruction, meeting places and travel expenses and from such courses.

Visual materials, such as color transparencies of cancer tissue, mo-on pictures and pamphlets, are being developed for use by medical cieties, hospitals and schools. These will make possible the dramatic esentation of up-to-date diagnostic and treatment methods to prac-cing physicians and allied workers.

This type of cancer instruction is also important for dentists, who ve the opportunity to detect first signs of oral cancer. Dental schools d societies are given the same types of assistance as that provided r physicians.

Nurses, upon whom so large a responsibility falls in the care of can-r patients, need special training too. Separate courses for both pri-ate and public health nurses may be arranged and financed.

CLINICAL FACILITIES

The *detection center* has come to be regarded as one of our most omising safeguards against fatal cancer. In such a center, physicians d technicians cooperate to give periodic examinations to apparently ell people, for the purpose of detecting cancer. An encouraging recent velopment is the cytologic test, which through laboratory examina-

tion of smears from body openings often reveals the presence o unsuspected internal cancer. This test is particularly successful at de tecting cancer of the uterus, one of the chief causes of cancer death among women.

Detection centers have found cancer in one and one half to tw percent of the apparently well persons examined. Forty to 50 percen of those examined were found to have other diseases in need of treat ment. Patients needing further examination or treatment are referre to their own physicians.

Since two women doctors, Elise L'Esperance in New York an Catherine Macfarland in Philadelphia, started the first cancer dete tion centers in 1937–38, centers have been opened in 28 States. Stand ards for their operation have been established by the American Colleg of Surgeons, and so far 124 centers are in operation. Most of them ar in metropolitan areas where they are operated and financed by privat organizations, such as local chapters of the American Cancer Society hospitals, medical schools, groups of physicians, and so on. No States can use Federal funds to help existing centers and to establis new ones in areas not now served.

Unlike the cancer detection centers, which serve apparently we persons, the *diagnostic clinic* is equipped to make exhaustive examina tions of persons suspected of having cancer. In most cases, these clinic are operated in conjunction with *cancer treatment clinics* and are lo cated in general hospitals, so that specialists and laboratory facilitie may be pooled for greatest efficiency.

Four hundred and seven of these clinics have been approved by th American College of Surgeons. A great many more are needed, sinc the goal is one clinic for every 50,000 persons. States may use Federa cancer funds to assist in their establishment and operation.

DIAGNOSIS AND TREATMENT

The demand for facilities for hospital treatment of cancer patient far exceeds the supply. There are an estimated 350,000 cancer patient

the United States, and while not all need hospitalization, the waiting lists are long. States may use Federal funds to set up and maintain additional beds and nursing service for cancer patients, thus helping the needy obtain these services. In States where cancer control laws permit, cancer funds may also be used to provide surgery and treatment for hopeful cases, and radiation for those who cannot pay.

Another source of free radiation is the radium loaned to hospitals by the National Cancer Institute. Purchase of radium was specifically authorized by Congress in 1939. Two hundred thousand dollars bought nine and a half grams, most of which have been on loan ever since to hospitals throughout the country. In 1947, fifty institutions and hundreds of patients were using Institute radium.

The importance of periodic examination for recurrence in patients who have been treated for cancer cannot be overestimated. To see that all such cases are taken care of, a well organized follow-up program is needed in each State. Use of cancer control funds for this purpose is encouraged.

Laboratory facilities for the prompt diagnosis of suspected cancer tissue are essential. Helping to provide them is another goal of the national cancer program. States are authorized to use their grants to set up central *tissue diagnostic services* where needed, or to subsidize hospitals, medical schools, private laboratories or pathologists to provide such services.

CANCER ORGANIZATIONS

As has been true of most other government programs for public welfare, the national cancer campaign was started after years of spade-work by non-government agencies had built up a public demand and acceptance for it. Biggest and best known private organization in the cancer field is the American Cancer Society, organized in

1913 by a group of doctors and laymen as the American Society for the Control of Cancer.

The Society's original and early contribution to the nation's fight against cancer was its educational campaign to convince the public and the medical profession that cancer could be handled if found early enough. It enthusiastically supported the government's large-scale entry into cancer research in 1937, and in 1945 added research to its own roster of activities. Of approximately $10,000,000 raised by the Society last year, $2,500,000 was allocated for research grants and fellowships. Most of this was distributed through the Committee on Growth of the National Research Council.

An organization that raises money to support research, is the Damon Runyon Cancer Fund, which solicits contributions mainly by radio and turns the money over to research groups. There are many other groups that give generously of their time and money to the big cancer drives and others that concentrate on specific problems. The American Contract Bridge League, for example, supports the fight against children's cancer. And in New York there is the National Cancer Foundation, Inc., primarily concerned with the care of advanced cancer patients.

There are in the United States a score or more of privately financed organizations interested in cancer research. A good many of them carry on research in their own laboratories. Among these are Memorial Hospital and the Sloan Kettering Research Institute in New York City, the Institute for Cancer Research in Philadelphia, the Roscoe B. Jackson Memorial Laboratory in Bar Harbor, Maine, the Rockefeller Institute for Medical Research in New York City, the Barnard Free Skin and Cancer Hospital in St. Louis, the Roswell Park Memorial Hospital in Buffalo, the Chicago Tumor Institute in Chicago, Illinois, and the M. D. Anderson Hospital for Cancer Research in Houston, Texas.

Others make grants available for outside research. Among these are e Donner Foundation in Philadelphia, the Jane Coffin Childs Memo- l Fund for Medical Research at Yale University, and the Anna ıller Fund in New Haven. There are also a great many research proj- ts in connection with universities and medical schools, some of them anced locally.

Many members of research groups in this country belong to the nerican Association for Cancer Research, which holds an annual entific conference. There is also an international group, the *Union ternationale Contre Le Cancer*, which meets at intervals of several ars. This year the *Union Internationale* and the American Associa- on for Cancer Research jointly sponsored the Fourth International ancer Research Congress held in St. Louis, Missouri.

RADIOISOTOPES FOR MEDICAL AND BIOLOGICAL RESEARCH AVAILABLE TO USERS OUTSIDE UNITED STATES

Radioisotopes, considered the most important medical research ol since the invention of the microscope, can now be produced in fficient quantity by the United States Atomic Energy Commission permit the 20 most important isotopes for medical and biological search to be made available in limited amounts and at reasonable st to qualified users outside of the United States.

Announcement of the newest American export for the hospitals and search laboratories of the world was to be made by President Tru- an in a message to the Fourth International Cancer Research Con- ess now in session in St. Louis.

Since the War Department's Manhattan District inaugurated the otope distribution program last year, more than 1200 shipments of

some 90 isotopes have been made to more than 160 institution throughout the United States. No security restrictions or restricte data as defined in the Atomic Energy Act of 1946, are involved in th research or therapeutic applications of radioisotopes by the non governmental institutions receiving them in the United States. I initiating the domestic isotopes program over a year ago, the Wa Department required that results of the work be freely published an the Commission has continued this policy in the United States an will make the same requirement of foreign users.

Foreign governments whose research workers request radioisotope must first agree:

1. To make progress reports to the United States Atomic Energ Commission every six months on the results of the work with th isotopes and to permit publication of the reports.

2. To insure that the radioisotopes are used for the purpose state in the requests, which must be approved by the Commission prior t shipment in the same manner as domestic requests.

3. To permit qualified scientists irrespective of nationality to visi the institutions where the materials will be used and to obtain infor mation freely with respect to the purposes, methods and results o such use, in accordance with well established scientific tradition.

Laboratories and medical research groups in the United States hav indicated a desire to have foreign scientists visit the institutions in thi country where medical and biological research with radioisotopes i under way. This, of course, does not apply to the restricted installa tions of the United States Atomic Energy Commission.

The proposed distribution program has been reviewed and ap proved by the United States Department of State.

Each foreign government whose research workers want radioiso topes from the United States will be asked to designate a representa tive in the United States to file requests and receive shipments, mak

yment within the United States, and upon receipt of the shipments ume responsibility for the safe handling in transit of the radioactive terials. Delivery will be made only in the United States.

The requests must indicate the names and experience of the persons o will use materials furnished, the name of the institution at which ey will be used, the purpose of the use, and a description of the alth and safety measures to be employed.

Isotopes available for foreign distribution do not include any radio- tive materials applicable to the development of atomic energy for litary or industrial purposes. No naturally radioactive materials are cluded, and no isotopes of any element of higher atomic number an element 83 (bismuth).

The following list of the radioisotopes available for foreign dis- bution indicates the principal fields of their use:

ntimony 122, 124, 125—Study of venereal and general parasitical diseases

rgon 37—Study of respiratory functions

rsenic 76, 77—Study of action of insecticides, arsenic drugs and fumes

romine 82—Studies of action of bromine drugs (including sedatives)

alcium 45—Study of bone and teeth formation; rickets and bone diseases

arbon 14—Studies of cancer; photosynthesis; biological processes

hlorine 36—Studies of chlorine utilization by the human body

obalt 60—Studies of cobalt utilization by animals; therapy requiring gamma radiation

opper 64—Botanical studies

old 198, 199—Studies of blood diseases, especially leukemia

dine 131—Therapy in thyroid disorders, including certain types of thyroid cancer

on 55, 59—Studies of the blood

Mercury 197, 203, 205—Studies of the action of mercuric drugs

Phosphorous 32—Polycythemia vera; chronic leukemia; bone and teeth formation; fat and protein metabolism

Potassium 42—Diseases of the nervous system

Silver 108, 110, 111—Study of drugs containing silver; radiation therapy

Strontium 89—Bone metabolism

Sulphur 35—Studies of amino acids and proteins; studies of action of penicillin and sulphur-containing drugs

Sodium 24—Studies of exchange of body fluids and blood flow, principally in connection with heart malfunctions

Zinc 65, 69—Studies of the action of insulin

UNITED STATES ATOMIC ENERGY COMMISSION
WASHINGTON 25, D.C.
September 4, 1947

id You Hear These

ROUND TABLE *Discussions*—

ON SCIENCE AND MEDICINE?

WHAT PROGRESS IN CANCER RESEARCH?—Charles Huggins, Carl R. Moore, C. P. Rhoads

NUTRITION IN A HUNGRY WORLD—Paul Cannon, Charles King, John Youmans

MUST MEN FIGHT?—Margaret Mead, Harlow Shapley, Malcolm Sharp

WARTIME LESSONS FOR PEACETIME PSYCHIATRY—Henry Brosin, Roy Grinker, William Menninger

ATOMIC ENERGY AND EVERYDAY LIFE—C. G. Suits, Harold C. Urey, Walter Zinn

HEALTH INSURANCE: PUBLIC OR PRIVATE?—Alexander Brunschwig, Dean Clark, Alton A. Sinford

THE CHILD IN TODAY'S CULTURE—Arnold Gesell, Robert J. Havighurst, Helen Koch

AGGRESSION IN CHILDREN—Arnold Gesell, Robert J. Havighurst, Adrian H. Vander Veer

y of these pamphlets will be sent to you for ten cents in coin

Order from the University of Chicago ROUND TABLE, *Chicago 37, nois. Pamphlets may be purchased in lots of 100 or more at special es upon request.*

SEP 1 5 194

YOU will like the *New* ROUND TABLE Pamphlet

Presenting an additional valuable article and special materials on the ROUND TABLE subjects

Read the ROUND TABLE discussions

Subscribe to the ROUND TABLE Pamphlet

Address the University of Chicago
ROUND TABLE · Chicago · Illinois

I would like to receive the ROUND TABLE Pamphlet regularly. Please enter my name on the subscription list—

- ☐ For six months at $1.50
- ☐ For eight months at $2.00
- ☐ For one year at $3.00

Name _____

Address _____

City _____ *State* _____

- ☐ I am inclosing the correct amount
- ☐ Please send me a bill

[PRINTED IN U.S.A.]